

# **Vermont Homeowner Renewable Energy Incentives: Towards An Effective Incentive Strategy**

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## **Introduction**

The development of homeowner renewable energy incentive programs is an issue of great importance to the citizens of Vermont. In this report, we begin by discussing energy generation and distribution in a global and national context, and outline three reasons why a transition to renewable energy is imperative. We then examine Vermont's place within these contexts and the opportunity the State has to become a leader in the development of the renewable energy market.

Next, we introduce the concept of renewable energy incentives. We discuss why they are good investments, how they compare to incentives at the utility level, and examine the challenges that exist for their success. We then provide a brief history of federal and state homeowner incentives. We focus specifically on Act 69's recent Vermont Solar and Small Wind Rebate Program, which ran out of funding in August, 2004. We then provide case studies of State renewable energy incentive programs in New York and California as examples of successful incentive programs that may provide guidance for the development of similar programs in Vermont. Finally, we present an analysis of incentive program options and make specific recommendations for the State of Vermont. The goal of this report is to elucidate the importance of a comprehensive renewable energy incentive strategy in stimulating economic growth, increasing national security, and mitigating climate destabilization and global warming.

## Section I: A Global and National Contextualization of the Renewable Energy Imperative

### *1. The Impacts of Energy*

We have become so engaged in a moment-to-moment global lifestyle, it seems as though our sense of the future is becoming progressively more truncated.

--- Ross Gelbspan<sup>1</sup>

...the quest for less problematic forms of energy and more energy-efficient technologies should be a top priority... From now on, we must take a proactive role in building our energy future, first by understanding why and how our energy system must be transformed, and then by working to ensure that the shift takes place.

--- Paul Roberts<sup>2</sup>

Energy generation and distribution define today's world: in its economic, political, and social impacts, energy drives our daily lives. Indeed, we are embedded in a global economy that is dominated by access to, and control of, sources of energy. While energy sources vary widely both within and among societies around the world, the twentieth and early twenty-first centuries have been dominated by the fueling of the industrial world through petroleum. The United States was once a leading producer and exporter of oil, yet production has been declining steadily for decades: dependence on foreign oil now accounts for 55% of U.S. consumption, and petroleum imports from the Organization of Petroleum Exporting Countries (OPEC) currently account for 40-45% of total imports.<sup>3</sup> Furthermore, oil dependency has serious macroeconomic implications. As Blanchard demonstrates, increases in the price of oil were the main cause of the 1973-1975

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<sup>1</sup> Ross Gelbspan, *Boiling Point: How Politicians, Big Oil and Coal, Journalists, and Activists Have Fueled the Climate Crisis – And What We Can Do to Avert Disaster* (New York: Basic Books, 2004), 202.

<sup>2</sup> Paul Roberts, *The End of Oil: On the Edge of a Perilous New World* (Boston: Houghton Mifflin Company, 2004), 10, 332.

<sup>3</sup> James Gustave Speth, *Red Sky At Morning: America and the Crisis of the Global Environment – A Citizen's Agenda For Action* (New Haven: Yale University Press, 2004) 69.  
The United States Energy Information Administration, "Table 1.7: Overview of U.S. Petroleum Trade" ([http://www.eia.doe.gov/emeu/mer/pdf/pages/sec1\\_15.pdf](http://www.eia.doe.gov/emeu/mer/pdf/pages/sec1_15.pdf), accessed December 10<sup>th</sup>, 2004).

recession. While the OPEC cartel weakened between 1982 and 1998, it recovered enough strength to push the relative price of oil in 2000 to twice the relative price of 1998; these oscillations and shocks trigger periodic fears of returning recessions and detract from an economic climate of stability and long-term growth.<sup>4</sup> Oil dependency has also contributed to an accelerating process of climate destabilization and global warming that even many former skeptics recognize as a serious global issue. Indeed, the risks from global warming are of such gravity that according to climatologist Michael Glantz, “the way that various societies gamble with climate looks very much like a game of Russian roulette.”<sup>5</sup> As a result of these trends, continued reliance on oil “...is clearly going to become riskier by the year – technically, geologically, environmentally, and ultimately economically and politically.”<sup>6</sup> We may also recognize some of these same risks resulting from dependence on energy from coal and nuclear generation: coal emissions also contribute to climate destabilization along with air and water pollution, while nuclear energy is associated with the burden of radioactive waste management costs, health impacts, and the threat of meltdowns and security risks.<sup>7</sup> As a

#### **What’s wrong with nuclear and hydro power?**

While neither of these energy producing processes emits greenhouse gases, each has its own downfalls. Nuclear production generates radioactive waste, which presents both a major health and national security hazard. Major hydro products, such as Hydro Quebec, may be technically be renewable; however they cause habitat destruction and displace whole communities in their wake.

<sup>4</sup> Olivier Blanchard, *Macroeconomics: Third Edition* (New Jersey: Prentice Hall, 2003), 144, 152.

<sup>5</sup> Michael Glantz, *Climate Affairs: A Primer* (Washington DC: Island Press, 2003) 8.

<sup>6</sup> Paul Roberts, *The End of Oil: On the Edge of a Perilous New World* (Boston: Houghton Mifflin Company, 2004), 64.

<sup>7</sup> Vermont Public Interest Research Group, “Global Climate Change” (<http://www.vpirg.org/campaigns/sustainableVermont/climate.html>, accessed December 10<sup>th</sup>, 2004). Paul Ehrlich and Anne Ehrlich, *One With Nineveh: Politics, Consumption, and the Human Future* (Washington DC: Island Press, 2004), 154.

result, nonrenewable energy sources such as petroleum, coal, and nuclear power contribute to an energy strategy that is increasingly plagued by liability rather than strength.

## ***2. Three Reasons to Transition to Renewable Energy***

At the fundamental level, there are three reasons why a transition to alternative energy sources is imperative for the United States: **1)** rising petroleum costs stunt economic growth; **2)** dependence on foreign oil and nuclear energy pose threats to national security; and **3)** fossil fuels exacerbate and perpetuate the global warming crisis.

First, rising petroleum costs pose a serious threat to economic growth: as increasing amounts of resources must be devoted to energy costs, fewer may be channeled towards capital investment, technological innovation, and productivity gains. Indeed, as Paul Roberts has recently shown, “six of the last seven global recessions have been preceded by spikes in the price of oil, and fear is growing among economists and policymakers that, in today’s growth-dependent, energy-intensive global economy, oil price volatility itself may eventually pose more risk to prosperity and stability and simple survival than terrorism or even war.”<sup>8</sup> The U.S. government allocates substantial funds – estimated at \$20

### **What is renewable energy?**

Renewable energy is energy derived from sources that cannot by all practical means be depleted. Examples include solar photovoltaic (PV), solar thermal, wind, wave, hydro, some forms of geothermal and some forms of biomass. ([www.energy.qld.gov.au/glossary.htm](http://www.energy.qld.gov.au/glossary.htm))

million each year – that creates and perpetuates a false sense of “cheap energy” by giving the impression that energy costs are lower than they actually are when government funds

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Harvey Wasserman, “A Return to Nuclear Madness? The Psychotic Attempt to Bring Back Atomic Energy” ([http://www.vpirg.org/campaigns/cleanEnergy/nuke\\_madness.html](http://www.vpirg.org/campaigns/cleanEnergy/nuke_madness.html), accessed December 10<sup>th</sup>, 2004).

<sup>8</sup> Paul Roberts, *The End of Oil: On the Edge of a Perilous New World* (Boston: Houghton Mifflin Company), 94.

are taken into account.<sup>9</sup> As a result, our tax dollars are being channeled out of the nation to support foreign suppliers of petroleum rather than being invested in domestic renewable energy sources. What we actually pay, then, in energy costs is well above the price posted at gas stations and on energy bills, and the price our society pays for stubborn oil dependency will only continue to rise as oil becomes increasingly scarce.

Second, the interconnection between the security of our energy system and the security of our nation has gained increasing recognition. Indeed, “electrical blackouts and gasoline price spikes have reminded us of the vulnerability of our energy system and our precarious dependence on foreign producers.”<sup>10</sup> A study done by the Department of Energy examined the manner in which a lack of planning and increasing potential threats has “...left energy systems vulnerable to natural disasters, terrorism, and other hazards that threaten not only economic well-being but also the lives and welfare of individuals.”<sup>11</sup> Furthermore, energy expert Paul Roberts perceives that “Iraq is simply the latest reminder...that in a global economy dependent largely on a single fuel, ‘energy security’ is a thin fiction.”<sup>12</sup> In contrast to our current geopolitical situation, Joel Gordes – an energy consultant, former legislator, and expert on renewable energy incentives – cited source diversification, decentralization, and avoidance of long-distance transport as key steps in increasing the security of our energy and our nation.<sup>13</sup> Renewable energy offers the potential for crucial progress in each of these steps. We must transfer our

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<sup>9</sup> Ross Gelbspan, *The Heat Is On: The Climate Crisis, The Cover-Up, The Prescription* (Cambridge, Massachusetts: Perseus Books, 1998), 188.

<sup>10</sup> Paul Roberts, *The End of Oil: On the Edge of a Perilous New World* (Boston: Houghton Mifflin Company), 9.

<sup>11</sup> Joel Gordes, “Rating the States for Energy Security” (ASES Solar 2003 Conference), 5.

<sup>12</sup> Paul Roberts, *The End of Oil: On the Edge of a Perilous New World* (Boston: Houghton Mifflin Company), 238.

<sup>13</sup> Joel Gordes, “Rating the States for Energy Security” (ASES Solar 2003 Conference), 4.

recognition of the security threats associated with nonrenewable energy into a commitment to support the renewable energy industry and the increased security it is able to provide.

Finally, the fossil fuel economy has contributed to the destabilization of the earth's climate, with increasing recognition that global climate change wreaks environmental damage of unfathomable magnitude. Though scientific uncertainties exist with regard to the specificities of the changes induced, there is widespread consensus concerning the fundamental reality of global warming and its potential for disruption of biological, atmospheric, geological, oceanic, and ecological cycles. Furthermore, scientific attention to human impacts on the atmosphere dates back much further than generally realized. Indeed, the first calculation of global warming from human emissions of carbon dioxide was published in 1896, and several reports from the 1930s reinforced these early findings and renewed research efforts to examine the greenhouse effect of carbon dioxide.<sup>14</sup> Scientific understanding of global warming has steadily grown, to the extent that more than two thousand scientists from one hundred countries reported to the United Nations in 1995 that our burning of fossil fuels is changing the earth's climate.<sup>15</sup> Furthermore, the U.S. Environmental Protection Agency states: 'Scientists know for certain that human activities are changing the composition of Earth's atmosphere. Since pre-industrial times, increasing levels of greenhouse gases like carbon dioxide (CO<sub>2</sub>) in the atmosphere have been well documented. There is no doubt this atmospheric buildup

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<sup>14</sup> Spencer R. Weart, *The Discovery of Global Warming* (Cambridge Massachusetts: Harvard University Press, 2003), 202.

<sup>15</sup> Jim Motavalli, Ed, *Feeling the Heat: Dispatches From the Frontlines of Climate Change* (New York: Routledge, 2004), 1.



of carbon dioxide and other greenhouse gases is largely the result of human activities.”<sup>16</sup> These changes in the atmosphere trigger complex feedbacks in the earth’s natural cycles: ocean currents are disrupted, and plant and animal communities are severely stressed. Indeed, “of all the types of environmental pollution caused by human activities none may have such profound effects (as global warming). We must expect widespread extinctions as floras and faunas fail to keep track and keep up with the rate of change in global temperatures.”<sup>17</sup> The global warming crisis may be averted and mitigated if a commitment to action is made: the transition away from nonrenewable energy and towards renewable energy is vital if efforts to stabilize the earth’s climate and the global ecosystem are to be successful.

### ***3. Vermont As Embedded in the National and Global Contexts***

Within this national context of rising petroleum costs, threats to security, and global climate change, Vermont is perceived by many as a relatively independent, safe, and environmentally-conscious State. Indeed, as Lieutenant Governor Brian Dubie has expressed in outlining his vision of a Green Valley akin to California’s Silicon Valley, “at home and abroad, Vermont is recognized as a leader in environmental stewardship.”<sup>18</sup> Furthermore, the strength of Vermont’s tourism industry attests to the State’s wealth of natural and cultural resources as well as its popularity and recognition as an exemplification of authentic New England rugged individualism. And yet Vermont has yet to live up to this image in several important ways: much of the state’s energy comes

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<sup>16</sup> The United States Environmental Protection Agency, “Global Warming – Climate” (<http://yosemite.epa.gov/oar/globalwarming.nsf/content/climateuncertainties.html>, accessed December 10, 2004).

<sup>17</sup> Colin Townsend, John Harper, and Michael Begon, *Essentials of Ecology* (Meldon, Massachusetts: Blackwell Science, 2000), 479.

<sup>18</sup> Vermont Department of Economic Development, “Vermont – Home to Green Valley” (<http://thinkvermont.com/greenvalley/>, accessed December 10, 2004).

from out-of-state or dangerous sources that pollute the environment, drain the state economy, and pose continuous threats as targets for terrorist attacks. In fact, 67% of the state's grid electricity comes from the Vermont Yankee nuclear plant and the hydropower dam operated by Hydro Quebec.<sup>19</sup> However, the opportunity to proactively achieve Vermont's potential exists, as Vermont Yankee's license is set to expire in 2012, while the State's contract with Hydro Quebec expires between 2016 and 2020.<sup>20</sup> As a result, within the next approximately 15 years, a large portion of Vermont's electricity mix will be changing and these changes present a tremendous opportunity. Vermont's commitment to renewable energy market development may provide sustained economic stimulus and a position of leadership in the renewable energy economy. It will also most certainly increase our energy security, and contribute to the mitigation of global warming and climate destabilization. The choice is, therefore, ours to make. Our nation and our State stand at a crossroads: we may choose the false security of relying on what has been, or commit to the true security of creating what may be.

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<sup>19</sup> Vermont Public Interest Research and Education Fund, "Clean Energy for Vermont: A Plan Today for Tomorrow" ([http://www.vpirg.org/downloads/2004.08.27\\_Clean\\_Energy\\_for\\_Vermont\\_final\\_version.pdf](http://www.vpirg.org/downloads/2004.08.27_Clean_Energy_for_Vermont_final_version.pdf), accessed December 10, 2004), 21.

<sup>20</sup> Vermont Department of Public Service, "Vermont Electric Plan 2004: Public Comment Draft, August 6, 2004" (<http://www.state.vt.us/psd/index/DPS%20Public%20Comment%20Draft%20Electric%20Plan%202004.pdf>, accessed December 10, 2004), 4-6.

## Section II: Homeowner Renewable Energy Incentives

### 1. What Are Homeowner Renewable Energy Incentives?

Throughout the United States, a variety of state and local utility incentive programs exist for homeowners wishing to install their own renewable energy systems (See Appendices 1-4).<sup>21</sup> While federal incentives began in response to the energy crises of the 1970s, homeowner incentives ended by 1986 and none currently exist. States have therefore taken a leadership role in homeowner renewable energy incentives. The majority of these state and local incentives are for solar systems, including photovoltaic and hot water heating, and many also exist for wind, renewably-charged fuel cells, and increased energy efficiency in the home. Types of incentives fall under three

#### **Types of homeowner incentives for renewable energy**

**Buy-downs**- Some grant programs exist, but rebate programs are more popular, acting as a quick boost to the renewables industry. Rebates are usually a certain percentage of the total system cost, or a dollar amount per installed Watt.

**Tax credits**- Income tax credits, property tax exemptions, and sales tax exemptions are all possibilities. Currently, Vermont has only a sales tax exemption.

**Loans**- Long-term financing plans are necessary to encourage investment in renewable systems, and in conjunction with buy-downs and tax credits are an important factor in an individual's choice to purchase a system.

broad categories: 1) "buy-downs" such as direct grants or rebates, 2) low-interest loans and long-term financing programs, and 3) income, sales, and property tax exemptions,

<sup>21</sup> Note: these Appendices come from the Database of State Incentives for Renewable Energy (DSIRE), which is an ongoing project of the Interstate Renewable Energy Council (IREC) funded by the U.S. Department of Energy and managed by the North Carolina Solar Center. DSIRE is updated as frequently as possible; however, DSIRE managers rely on contacts from individual states as well as various newsletters for updated information regarding program expirations and changes. DSIRE managers go through the complete database at least once a year to contact experts from each state. However, this means that the maps shown in the Appendices may not have been updated to show the most recent changes in incentive programs. For example, Vermont's rebate program (which expired in August, 2004) is shown on the map.

deductions, or credits.<sup>22</sup> Rebates usually pay between \$1-5 per installed Watt, with a maximum value prescribed; some programs simply pay a certain percent of the total installed cost. Most incentive programs require the renewable system to be connected to the local grid and are supported by net-metering laws that allow homeowners to continue using outside energy if required, or to roll-back their meters by giving excess production back to the grid.

## ***2. Why Are Homeowner Renewable Energy Incentives A Good Investment?***

As discussed previously, we are increasingly confronted with the consequences of our energy dependence on petroleum: economic, security, and environmental concerns loom large. Indeed, our country's high dependence on foreign oil and centralized system of energy distribution has lead to a staggering lack of energy security. At the state level, Vermont is noticeably vulnerable, with the majority of its energy (67%) coming from Hydro-Quebec and the aging nuclear Vermont Yankee plant.<sup>23</sup> Homeowner incentives are a small piece of what must be a larger, more comprehensive solution: they offer several advantages as Vermont transitions towards increasing reliance on renewable energy sources.

First and foremost, homeowner incentives foster the growth of decentralized and diverse energy production, which is an important component in energy and national security. As then-Assistant Secretary of Energy David Garman expressed in 2001, "Distributed generation at many locations around the grid increases power reliability and quality while reducing the strain on the electricity transmission system. It also makes our

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<sup>22</sup> Susan Gouchoe et al, "State Incentives for Renewable Energy: Case Studies on Program Effectiveness" (AEES Solar 2003 Conference).

<sup>23</sup> Vermont Public Interest Research and Education Fund, "Clean Energy for Vermont: A Plan Today for Tomorrow" ([http://www.vpirg.org/downloads/2004.08.27\\_Clean\\_Energy\\_for\\_Vermont\\_final\\_version.pdf](http://www.vpirg.org/downloads/2004.08.27_Clean_Energy_for_Vermont_final_version.pdf), accessed December 10, 2004), 21.

electricity infrastructure less vulnerable to terrorist attack, both by distributing the generation and diversifying the generation fuels. So if you're engaged in this effort, it is my view that you are also engaged in our national effort to fight terrorism."<sup>24</sup> In order to decrease our vulnerability to external or internal energy system failures, we must invest in "numerous, small, modular, fuel diverse generators capable of independent operation when the grid is disrupted."<sup>25</sup>

Additionally, homeowner incentives are a good investment of state funds because they stimulate the growth of the renewable energy industry and enable renewable energy to become competitive with nonrenewable energy. The money channeled into renewable energy through incentive programs thus not only provides homeowners with the ability to install their own renewable energy systems, but also stimulates the renewable energy equipment and installation industries and therefore contributes to sustained growth and increased employment.

### ***3. Why At the Homeowner, Versus the Utility, Level?***

An important issue to consider is the importance of homeowner renewable energy incentives as compared to incentives for renewable energy at the utility level. To make an informed decision on this issue, it is necessary to examine the context of renewable energy already in place in a given area or state so that the goals of an incentive program may be contoured to best utilize incentive funding. As Andrew Perchlik of Renewable Energy Vermont explains, the relative importance of homeowner versus utility incentives

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<sup>24</sup> Joel Gordes, Environmental Energy Solutions (personal communication, December 5th, 2004).

<sup>25</sup> Joel Gordes, "Rating the States for Energy Security" (ASES Solar 2003 Conference), 4.  
Paul Ehrlich and Anne Ehrlich, *One With Nineveh: Politics, Consumption, and the Human Future* (Washington DC: Island Press, 2004), 156.

for renewable energy entirely “depends on your goals.”<sup>26</sup> An incentive program aimed at utilities is most effective if the goal of the program is to facilitate the highest amount of renewable energy generation and production possible. Indeed, “large scale renewables such as wind power are more economical than small scale.”<sup>27</sup> However, an incentive program seeking to support diverse and distributed generation, increase individual and family energy awareness and foster a personal sense of environmental stewardship, and serve as public education about renewable energy is most appropriate for the homeowner level.<sup>28</sup> And while utility-scale renewable energy is able to achieve economies of scale, homeowner renewable energy generation has also proven to be cost-effective and may often lower bills for homeowners.<sup>29</sup>

Vermont is already home to a growing number of utility-scale renewable energy projects, as a recently constructed database of renewable energy in the State demonstrates ([http://f04.middlebury.edu/envs0401a/students/image\\_studies/](http://f04.middlebury.edu/envs0401a/students/image_studies/)). As a result, the goal of an incentive program in Vermont should focus where stimulus is most needed: at the homeowner level. As Andrew Perchlik expresses, “currently there are utility projects underway (wind farms, farm and landfill methane) so...it is the customer sited projects that need the incentives to overcome market barriers.”<sup>30</sup> Indeed, “support is needed for both large and small renewables as our energy problems are very, very large.”<sup>31</sup> It is thus our hope that renewable energy in Vermont will continue to grow at both the homeowner and utility levels.

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<sup>26</sup> Andrew Perchlik, Renewable Energy Vermont (personal communication, December 6, 2004).

<sup>27</sup> David Blittersdorf, NRG Systems, Inc (personal communication, December 5, 2004).

<sup>28</sup> David Blittersdorf, NRG Systems, Inc (personal communication, December 5, 2004). Susan Gouchoe, North Carolina Solar Center (personal communication, December 7, 2004).

<sup>29</sup> Susan Gouchoe, North Carolina Solar Center (personal communication, December 7, 2004).

<sup>30</sup> Andrew Perchlik, Renewable Energy Vermont (personal communication, December 6, 2004).

<sup>31</sup> David Blittersdorf, NRG Systems, Inc (personal communication, December 5, 2004).

#### ***4. What Is An Appropriate Incentive Level?***

Nationally, incentive levels vary greatly among states and programs. Rebates or tax credits are often given as a dollar amount per installed Watt, ranging from \$1.50 per Watt in the bottom tier of the Vermont Small Wind and Solar Rebate, to an all-time record high of \$6 per Watt in a past program in Illinois. Other programs give incentives based on a percentage of the installed cost of the system. Both of these options usually set a top dollar amount of incentive per project. According to Susan Gouchoe of the North Carolina Solar Center, one important aspect of incentive levels is that they begin high and taper off as the renewable energy industry grows and no longer needs support to compete with other energy industries.<sup>32</sup>

Part of what contributes to the ideal level of incentive for renewable energy systems is the current cost of electricity in the area. If the cost of electricity is low, a higher incentive will be needed to get people to switch to renewable energy; if the cost of electricity is high, a much lower incentive is required.<sup>33</sup> Vermont has relatively high electricity costs at 10.2 cents per kilowatt hour, compared with a national average of only 6.68 cents. Thus, a much lower level of incentive is required in order to create a sufficient incentive to leverage investment and increase the overall number of renewable energy systems in the state.<sup>34</sup> As evidenced by the strong response to the low rebates (\$1.50- 2.50 per installed Watt) of the Vermont Small Wind and Solar Rebate Program last year, low incentives can be highly successful in Vermont. (See Section III: Past State Legislation for more on Vermont's past incentive program.)

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<sup>32</sup> Susan Gouchoe, North Carolina Solar Center (personal communication), December 7, 2004.

<sup>33</sup> Susan Gouchoe, North Carolina Solar Center (personal communication), December 7, 2004.

<sup>34</sup> Department of Energy Annual Electricity Publications, <http://www.eia.doe.gov/cneaf/electricity/epav1/fig12.html>, accessed December 10, 2004.

Other important factors to consider when deciding an appropriate incentive level are the goals and priorities of the program. While a higher dollar amount may give homeowners a higher incentive to invest in renewable energy, it also means that fewer overall incentives will be available. Andrew Perchlik of Renewable Energy Vermont notes that it is preferable to cap the incentive amount to encourage the production of many smaller systems rather than fewer large systems built by individuals who likely have greater economic resources.<sup>35</sup> This is especially relevant to situations where the funding for the program is limited and priorities must be strictly defined. Lower incentives distributed amongst a higher number of homeowners therefore mean a larger number of newly installed systems, and in addition also serve to increase the public's awareness of renewable energy.

Another component of the incentive level discussion is the degree to which incentives may be accessible to homeowners of diverse socioeconomic backgrounds. Indeed, there remains considerable debate concerning this issue and whether or not various incentive levels are more or less successful in attracting lower-income homeowners. Perchlik believes that if the incentive is a rebate provided at a set dollar amount per installed Watt, lower-income homeowners are still able to participate in the program, and may simply rather only be able to afford to build smaller renewable energy systems.<sup>36</sup> David Blittersdorf of NRG Systems, however, believes that it is unrealistic to consider renewable energy incentives as appealing for low-income populations as the

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<sup>35</sup> Andrew Perchlik, Renewable Energy Vermont (personal communication), December 6, 2004.

<sup>36</sup> Andrew Perchlik, Renewable Energy Vermont (personal communication), December 6, 2004.



initial investment in renewable energy systems necessitates a long-term investment and delayed payback.<sup>37</sup>

Overall, then, our research and contacts with various incentive program and renewable energy industry experts shows that it is important to match the level of incentive with the current energy costs of the target area and the goals of the specific program.

### ***5. What Are the Main Obstacles to A Successful Renewable Energy Incentive Strategy?***

The primary barrier to the effectiveness and success of renewable energy incentives is a lack of sufficient and sustained funding. Recent federal budget deficits and strained state budgets have increasingly limited the funding of new initiatives. For some, renewable energy continues to be perceived be as different from the norm, and therefore as a risky investment. This perceived risk causes moneylenders hesitate in making loans to renewable homes, and also causes homeowners to be hesitant to install renewable systems. Some policymakers also continue to be resistant in directing public funds towards renewable energy incentives. However, renewable energy is a secure technology that continues to improve in reliability. Indeed, it is our hope that distributed and diverse types of renewable energy will soon become the dominant means of generating energy in our own society and throughout the world. Policymakers have a crucial role to play in changing the perception of renewable energy as a risky and unproven technology. Inceptive programs can be one such strategy for playing this important role.

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<sup>37</sup> David Blittersdorf, NRG Systems (personal communication), December 5, 2004.

In addition to the quantity of funding, the sustained nature of the funding is an integral component to a successful incentive. Often, an incentive program is funded for only a short period of time, which actually may work to inhibit the growth of the renewable energy industry that the incentives are designed to facilitate. This may happen as the incentive programs provide intermittent shocks to the industry, surging demand suddenly and then, when funding ends, causing consumers to wonder what problems occurred and whether new programs will be created. Intermittent funding, therefore, inhibits the maximization of the effectiveness of an incentive program: public confidence waivers and the industry scrambles to respond to large fluctuations in demand.

Additionally, there are a variety of external factors that impact the effectiveness and success of incentive programs, such as the availability of quality producers and installers of renewable systems, the level of education of the public about renewable energy options, and the ease of the application process.<sup>38</sup> These obstacles to success, however, are easily overcome with a carefully constructed incentive plan that allows for sufficient and sustained funding. Indeed, Vermont has a history of homeowner “do it yourself” initiatives in the renewable energy movement, as well as a growing interest in renewable energy options.<sup>39</sup>

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<sup>38</sup> Susan Gouchoe et al, “State Incentives for Renewable Energy: Case Studies on Program Effectiveness” (AEES Solar 2003 Conference).

<sup>39</sup> David Hill, Vermont Energy Investment Corporation (personal communication, November, 2004).

### **Section III: Past Renewable Incentive Legislation**

#### ***1. Federal Legislation.***

In 1978, responding to the oil shocks and energy security concerns of the 1970s, President Carter signed into law the National Energy Act (NEA). This law was a compendium of five bills, and sought to decrease American dependence on foreign oil by increasing energy conservation and efficiency. A major regulatory mandate that has encouraged renewable energy, the Public Utility Regulatory Policies Act of 1978 (PURPA), was established as a result of the NEA. Much of the remaining Federal renewable energy legislation enacted since the late 1970s has been focused on financial incentives.<sup>40</sup> From 1978 to 1985 federal tax credits for home solar systems were available for 40 percent of the total cost; many states added on extra incentives.<sup>41</sup> While the incentive programs successfully stimulated growth of the renewable energy industry, the resulting “mushrooming demand” meant that the market was not prepared: many producers and installers started up without proper training or qualifications, resulting in the installation of many systems that were dysfunctional or faulty. This created a negative image of the renewable energy industry to the extent that when the federal program expired in 1986, most renewable energy companies went out of business. This left thousands of “orphan systems” without technical support.<sup>42</sup> For example, many solar hot water systems were installed during the period of high incentives that were unable to be repaired or maintained by qualified technicians after the incentives expired and the

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<sup>40</sup> Mark Gielecki, Fred Mayes, and Lawrence Prete, “Incentives, Mandates, and Government Programs for Promoting Renewable Energy” (Energy Information Administration: [http://www.eia.doe.gov/cneaf/solar.renewables/rea\\_issues/incent.html](http://www.eia.doe.gov/cneaf/solar.renewables/rea_issues/incent.html), 2001).

<sup>41</sup> Leigh Seddon, Solar Works (personal communication, November, 2004).

<sup>42</sup> Susan Gouchoe et al, “Case Studies on the Effectiveness of State Financial Incentives for Renewable Energy” (National Renewable Energy Laboratory), 2-3.

market dramatically shrank.<sup>43</sup> Thus, an important lesson from this early market boom-and-bust is the necessity of quality assurance and oversight in renewable energy incentive programs. Since the 1980s, state programs have taken the lead in renewable energy market development.

## ***2. Vermont Legislation***

During the period of the federal tax credits, Vermont had an additional 25 percent credit for owners of renewable energy systems. However, like most state programs, Vermont's tax credit expired a year after the federal program ended. It had been used primarily for solar hot water systems, as well as some photovoltaic systems and passive solar projects.<sup>44</sup>

Since the original program's expiration, the Vermont legislature has considered several incentive options and programs concerning renewable energy (see Appendix 1). In comparison with other states, however, the Green Mountain State has actually passed very few measures to encourage homeowner renewable energy use. The only recent example is the Vermont Solar and Small Wind Incentive Program, which was signed into law in the spring of 2003 and provided \$581,000 from a petroleum escrow fund to rebates for solar electric, small wind, and solar hot water systems. The program was unique in that it provided rebates to both on and off-grid systems. Later, \$380,000 was added to the program by Central Vermont Public Service and Green Mountain Power utilities from money they had to pay to the Nuclear Energy Insurance Liability Fund while they had a stake in Vermont Yankee. This brought the total to \$961,000, nearly a million dollars to be spent on renewable energy rebates.

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<sup>43</sup> Susan Gouchoe, North Carolina Solar Center (personal communication, December 7, 2004).

<sup>44</sup> Leigh Seddon, Solar Works (personal communication, November, 2004).

Homeowners received a rebate on a two-tier level, whether they used one of the 3 types of renewable systems or some combination of them. Systems installed by Vermont Solar and Wind approved partners were eligible for \$2.50 per installed Watt/Btu up to 40% of the total system cost or a maximum of \$12,500. Systems installed by non-partners were eligible for \$1.50 per installed Watt/Btu up to 40% total cost not to exceed \$7,500. It was expected that rebates would be approved for 120-150 new systems in a 1-2 year timeframe, with an estimated \$1.5 million in private investment. However, the program was so well received that funding was completely allocated within 9 months, by August, 2004, with 200 reservations for new systems and a private investment of \$2.2 million leveraged. These systems are estimated to produce 452 mega watts and 671 million BTUs of energy each year, and will reduce carbon emissions by 356 tons.<sup>45</sup> In an informal survey of partner businesses, a 60% increase in systems installed and a doubling of gross revenues and employees was seen throughout the duration of the program. While the actual level of incentive was much lower in Vermont than in other states, market response proved to be strong, providing a relatively high return to the industry for each dollar of state investment.<sup>46</sup>

The magnitude of the program's impact on the industry was impressive. As industry expert David Blittersdorf explained, "before (the Small Wind and Solar rebate program) about \$300,000 worth of equipment was installed. It was a very small market here - mostly small off-grid solar PV systems. The incentive program had a *huge*

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<sup>45</sup> Vermont Department of Public Service. "Vermont Solar and Small Wind Incentive Program: Progress Report" (Oct. 6, 2004).

<sup>46</sup> David Hill et al, "Solar in Vermont: New Lessons from the Green Mountain State" (Vermont Energy Investment Corporation).

impact” and grew the market almost tenfold.<sup>47</sup> Blittersdorf goes on to comment that, “without the incentives... dealers will be laying off staff and some will probably go out of business...they are right now working to install the reserved systems but by spring will have no work. The state needs to fund (a new rebate program) this spring”.<sup>48</sup>

Vermont has a demonstrated interest in renewable energy and the capacity to install and maintain these systems. Indeed, a statewide poll given in March 2004 by the Opinion Research Corporation Company reported that 83% of those 400 polled indicated that they would like to see more renewable energy in Vermont’s future.<sup>49</sup> Vermont also has an existing infrastructure to administer incentive programs, and a large group of qualified installers.<sup>50</sup> However, the remaining incentives available to homeowners are a sales tax exemption for the purchase of renewable systems, net-metering laws, and the opportunity to participate in the national Mainstay Energy Rewards Program, a private company that purchases the environmentally friendly components of renewables from producers and sells them on the market as a way to use renewables without actually physically installing a system. However, with no rebate or loan programs, and no significant tax credits available, Vermont’s incentive program is lacking in its support of renewable energy.

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<sup>47</sup> David Blittersdorf, NRG Systems, Inc (personal communication, December 5, 2004).

<sup>48</sup> David Blittersdorf, NRG Systems, Inc (personal communication, December 5, 2004).

<sup>49</sup> Opinion Research Corporation (<http://www.macoint.com/>, accessed December 10, 2004).

<sup>50</sup> Renewable Energy Vermont, “Renewable Energy Services Search” ([http://www.revermont.org/search\\_result.php](http://www.revermont.org/search_result.php), accessed on December 10, 2004).

## **Section IV: Learning From Near and Distant Neighbors**

While Vermont increasingly considers incentive programs, lawmakers can look to several other states for examples of effective, comprehensive, and well-funded initiatives. Our close neighbor, New York, has recently implemented a variety of incentives for renewables, while California historically has been a leader in state facilitation of renewable energy use, and remains so today. The following profiles are based on information obtained from the Database of State Incentives for Renewable Energy (DSIRE), a comprehensive resource accessible at [www.dsireusa.org](http://www.dsireusa.org).

### ***1. New York Renewable Energy Incentive Programs***

The State of New York has one of the most comprehensive renewables incentive programs in the country, including tax credit, buy down, and loan programs. The majority are operated by the New York State Energy Research and Development Authority (NYSERDA), a government agency. Previously, funding came from the general tax pool, but programming was severely limited. Three years ago, the Public Service Commission increased a public benefit charge on all electricity bills to better fund the initiative, and the number and quality of incentive programs “exploded,” according to Joel Gordes.<sup>51</sup> The charge varies between locales within New York, but an average consumer of electricity pays less than a dollar a month towards the Public Benefit Fund. In total, the Fund was raised from an annual \$78 million to \$150 million,

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<sup>51</sup> Joel Gordes, (personal communication, November, 2004).

\$14 million of which is allocated to renewable energy incentives.<sup>52</sup> Long Island has its own separate program, funded by the Long Island Power Authority, a public utility.

Gordes noted that one of the reasons New York's program has been so successful is the support of the governor, George Pataki, who is strongly in favor of renewable energy use. When Pataki came into office in the early 1990s, he cut the existing Public Benefit Fund substantially. A few years later, in the face of energy shortages and possible blackouts, he has become a champion for renewable energy incentives and other measures to reduce the state's energy consumption. Not only has New York developed one of the strongest incentive programs in the country, it has also been a leader in terms of infrastructure facilitation such as the training and certification of renewables installers. The following is a compilation of renewable incentives available to homeowners in New York, information that can be found on the DSIRE website.<sup>53</sup>

#### **Energy Smart Loan Fund**

- Loans on a variety of renewables, Energy Star appliances
- Maximum loan \$20,000 or \$5 million for multi-family units
- Interest rates 4% below market rates

#### **Green Building Tax Credit Program**

- Solar electric, hot water, fuel cells, energy efficiency
- Tax credit between 25-100% total cost
- \$25 million allocated for period 2001-2009 (\$18 million already used as of 3-04)

#### **LIPA Solar Pioneer Program**

- Administered by the Long Island Power Authority
- Rebates at \$4.50/Watt up to \$45,000

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<sup>52</sup> Richard Pérez-Pena, "Pataki Administration to Bolster Spending on Energy Conservation," *New York Times*, Jan. 25, 2001.

<sup>53</sup> Database of State Incentives for Renewable Energy, ([www.dsireusa.org](http://www.dsireusa.org), accessed December 10, 2004).



**PV Incentive Program**

- \$4-4.50/Watt rebate on photovoltaics up to 60% total cost
- \$7 million allocated, \$3.5 million already reserved

**Soar and Fuel Cell Electric Generating Equipment Tax Credits**

- Personal income tax credit of 25% of \$6/Watt

**Solar and Wind Systems Exemption**

- 15 year property tax exemption
- Variety of solar and wind technologies

**Wind Incentive Program**

- 15-70% rebate up to \$100,000

Overall, New York has an impressive array of program offerings, and is growing in scope each year. Working together, the sustained funding of rebate, tax credit, and loan programs provides homeowners with a variety of options for financing renewable energy systems. Additionally, New York's attention to external factors such as installer certification and public education is notable. Along with these features, the Public Benefit Charge used in New York is a good example of a possible funding strategy for similar programs in Vermont.

***2. California Renewable Energy Incentive Programs***

The state of California has an exemplary set of complementary incentive programs for homeowners. On top of statewide tax credits, buy downs, and loans, many public utilities have additional incentive programs for their local users. The utility sponsored programs give rebates of \$3-5/Watt up to maximums of \$60,000 in some cases. Such generous funding is mandated by the State Assembly Bill 1890, which requires public utilities to spend at least 2.85% of their total revenues on renewables, energy

efficiency, low income applications of such technologies, and research and development. According to Michael Zannakis of the Sacramento Municipal Utility District (SMUD), which runs both rebate and loan programs, the incentive programs are also cost effective for the utility. If they can successfully reduce one customer's use, it frees up that energy for others in a quickly growing market, and the utility avoids increasing its purchasing contracts. The following are California state programs not affiliated with local public utilities:

**California Property Tax Exemption for Solar Systems**

- Variety of solar electric, solar thermal
- Renewable systems are not included in owners' property taxes

**Emerging Renewables (Rebate) Program**

- Solar electric, solar thermal, wind, fuel cells
- Varying rebate amount, depending on technology type

**SELFGEN- Self Generation Program**

- Grid-tied solar, wind, fuel cells
- \$1-4.50/Watt rebate

**Tax Deduction for Interest on Loans for Energy Efficiency**

- Solar systems, energy efficiency measures
- Personal tax deduction of interest on loans used to pay for systems

Additionally, California has Net-Metering requirements of 0.5% peak demand for all utilities and solar contract licensing by the California Contractors State License Board. The sheer variety and quantity of incentive programs available makes California an excellent example of state support for homeowner renewable energy systems. While Vermont may not have the opportunity to work through public utilities to the extent that

California does, the state offers a vision of how incentives can effectively bring renewable energy to the public, making it affordable and commonplace.

## Section VI: Towards an Effective Incentive Strategy

### *1. An Effective Renewable Energy Incentive Strategy Must be Comprehensive, Sustained, and Informed of Key External Factors*

Bipartisan political leadership is essential to laying a foundation for renewable energy market development. In the past, renewable energy has been a politically and socially divisive issue. The time, however, has come to recognize renewable energy development as an interest of all Americans. This recognition has come from the Republican Governors of both California and

New York, who have both shown tremendous leadership in renewable energy market development. Political leadership in Vermont has the capacity to create an effective renewable energy incentive strategy for homeowners that is: **1)** sustainable; **2)** comprehensive; and **3)** informed of key external factors.

*Sustainable Funding:* Undoubtedly, the most important factor in determining the success of an incentive program in stimulating the renewable market is the sustainability of funding. While incentive programs with finite funding provide important short-term stimulus, they are severely limited in their ability to support and

#### A successful incentive strategy is...

**Sustainable-** While many incentive programs are financed by escrow funds or other short-term monies, truly successful programs have a sustainable, long-term source of funding. This instills confidence in the market by the consumer, allows the industry to develop, and generally creates confidence in the stability of renewable energy.

**Comprehensive-** A variety of different program types working together will facilitate the most investment, both increasing use of renewables and giving the industry the support it needs.

**Informed of External Factors -** Outside of financial incentives, factors such as education of the population, availability of system installers, and ease of program access are all important in deciding the success of a program.

develop the renewable market. Often, the intermittent nature of program availability is a destabilizing shock in the sense that both buyer and industry expectations fluctuate depending on whether or not programs are available. A continued source of funding, such as a public benefit fund with a stable source of revenue, is necessary to provide a business environment where the industry can count on continued expansion of demand.

*Comprehensiveness:* Although one program by itself, such as the recent Small Wind and Solar Rebate in Vermont, can be effective in raising visibility of renewables and creating a short-term stimulus for investment, a cohesive package of a variety of program types is necessary to provide the support that the renewables industry needs to gain a foot hold in the energy market. As Gouchoe et al explain, “ A single financial incentive by itself is not likely to ensure significant market penetration of small-scale renewable energy technologies; implementing a set of complementary incentives... can have a significant market impact relative to historic small markets for PV and small wind.”<sup>54</sup> A comprehensive renewable package may include a combination of: buy-downs/rebates, loan financing, and tax credits. Buy downs, also known as rebates, encourage the purchasing of renewable energy systems by providing direct reimbursements to purchasers. These rebates are generally based either on a percentage of the total costs or on a per installed-Watt basis. Of all the incentive options, buy downs provide the most immediate benefits to the industry and are an excellent way to stimulate small scale renewable energy generation.<sup>55</sup> A disadvantage of buy downs is that they require greater administrative oversight than other incentive options, and are less

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<sup>54</sup> Susan Gouchoe, “State Incentives for Renewable Energy: Case Studies on Program Effectiveness” (AEES Solar 2003 Conference), 2.

<sup>55</sup> Susan Gouchoe, (personal communication, November, 2004).

applicable for large-scale projects as many buy down programs have a maximum level of rebate.

Loans and financing programs with lower interest rates and lower transaction costs relative to private lending arrangements can be an effective tool for lowering initial investment cost for homeowners.<sup>56</sup> However, Gouchoe also notes that loans are generally more favorable to larger projects that are unable to take advantage of rebate programs with maximum levels and that may also be subject to renewable energy mandates. Additionally, Gordes noted that financing options need to provide stronger incentives before they will truly benefit homeowners. Thus, loan programs are most effective in conjunction with buy-down programs that lower the initial price.<sup>57</sup>

Tax credits may take various forms: income tax credits provide a deferred incentive by requiring the initial payment of equipment and installation costs that are later deducted from taxes; sales and property tax exemptions are more immediate in nature. In the past, tax credit programs have suffered from a lack of quality assurance of the investments of the state and homeowners. However, instituting equipment and installer standards may enable tax credits to provide incentives to sound investment. In addition, non-taxed entities such as schools and government agencies may be allowed to take advantage of these programs by partnering with a business that claims the tax credit and in turn gives direct payment to the non-taxed entity.

Buy-downs, loan programs, and tax credits are key components of a comprehensive renewable incentive strategy. As Gouchoe writes, “Clearly, states can not

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<sup>56</sup> Susan Gouchoe et al, “State Incentives for Renewable Energy: Case Studies on Program Effectiveness” (AEES Solar 2003 Conference).

<sup>57</sup> Susan Gouchoe et al, “State Incentives for Renewable Energy: Case Studies on Program Effectiveness” (AEES Solar 2003 Conference).

expect any one of these incentives by itself to remove all barriers to renewable energy technology.”<sup>58</sup>

***External Factors:*** According to Gouchoe, several factors external to incentive mechanisms themselves impact their effectiveness: ease of connecting renewable energy to utility grid systems, availability of qualified equipment installers and building inspectors, education about renewable energy and incentive options, and ease of access to incentive options. As we have seen from the previously discussed national incentive programs, without the proper external factors present, even the highly funded incentive strategy may run into problems.

## ***2. Recommendations for Renewable Energy Incentive Program Funding in Vermont***

In previous sections, we have outlined the ideal incentive program for homeowners as having sustainable funding, a comprehensive set of different incentive types, and the necessary supporting external factors. While we believe that this ideal is well within Vermont’s range of possibilities, we also realize that due to budgetary restrictions, often the ideal must be compromised for the practical. Thus, in a worst case-scenario, where only one type of incentive program could be funded, we recommend a rebate or buy down. As previously stated, the experts agree that the buy-down is the strategy most conducive to increasing renewables systems in homes, and also gives the industry a quick boost. In the past, the Vermont Solar and Small Wind Rebate Program exceeded expectations, running through available funding several months before the projected end date. According to David Hill of the Vermont Energy Investment

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<sup>58</sup> Susan Gouchoe et al, “State Incentives for Renewable Energy: Case Studies on Program Effectiveness” (AEES Solar 2003 Conference).

Corporation, Vermont homeowners' response to the program was incredibly strong, especially considering that the rebate offered was much lower than average. In other words, every dollar invested in homeowner renewable incentive programs in Vermont gets a much higher return in private investment and number of systems installed than in other states. George Lawrence of The McKernon Group, a green building company, suggests another source of funding for Vermont incentives. He suggests that the \$130 million currently earmarked for the VELCO line transmission upgrade (which will not actually produce new energy) be directed to renewable energy incentive programs instead.<sup>59</sup> While the state may be on a limited budget, it is apparent that many options exist for funding incentive programs.

A single rebate program, however, has limited long-term effects on the renewable energy industry and overall use of such technologies. Without sustainable funding, complementary programs, and supporting external factors, lone incentive programs have a limited impact. Thus, to truly increase Vermont's energy security, we recommend a comprehensive mix of tax credits, loans, and rebates, as seen in the cases of New York and California. With many of the necessary external factors already in place, such as education of the public, infrastructure to run the programs, and availability of qualified installers, Vermont lacks only the actual funding to become a leader in renewable energy incentives. The first step is to re-fund a buy-down program such as the recent Vermont Solar and Small Wind Rebate, and introduce either an income or property tax credit (or both) to complement the current sales tax exemption. Additionally, a subsidized loan program is necessary to sustain demand for renewable systems and provide continued support to the industry.

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<sup>59</sup> George Lawrence, The McKernon Group (personal communication), December 9, 2004.



All of these programs, of course, require a source of sustainable funding. While escrow funds are convenient, they are used up quickly; however there are a variety of options for long-term support. Some ideas include a surcharge on electricity bills or an addition to the gas

tax, the proceeds of which would go into a public benefit

**Potential Funding Sources for Renewable Energy Incentives**

1. Increase state tax on oil and gasoline sold in VT
2. Tax carbon emissions
3. Put a Public Benefit Charge on electricity bills
4. Increase sales tax

fund for renewables incentives (such as in New York).<sup>60</sup> Alternatively, sales tax could be raised slightly and directed towards renewables programs. If allowed to do so, Vermont Yankee will start storing spent fuel rods on site by 2008. In return, they will be required to pay the state \$5 million per cask, which could also be used to fund homeowner and other incentives. However, more important than the source of the funding is the necessity that it be a constant source of revenue so that whatever array of programs it backs is stable, raising confidence in renewable technologies and sufficiently supporting the renewables industry.

Vermont takes pride in its independent nature; from the backcountry woodsman to Jim Jeffords, the Green Mountain State presents itself as self-sufficient and autonomous of larger, more powerful entities. In truth, however, Vermont is staggeringly dependant on outside sources for the driving force of its economy, society, and our very existence—energy. Buying the majority of its electricity from vulnerable or outside sources such as Vermont Yankee and Hydro Quebec makes Vermont vulnerable in the face of raising energy prices, possible terrorist attacks, or simple system distribution

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<sup>60</sup> David Blittersdorf, NRG systems, (personal communication, November, 2004). David Hill, Vermont Energy Investment Corporation (personal communication, November, 2004).

failures. Additionally, buying energy from other states (and countries) sends money and jobs out of Vermont, hurting the state's economy. Recently, the threat of global climate change has also moved to the forefront of local, national, and international concern.

While neither nuclear nor hydro power contribute to greenhouse gas emissions, thinking on a global scale, if Vermont were to give them up, they would be available for use by other entities, thus reducing overall global emissions.

Renewables are the key to reducing Vermont's problematic energy dependence, and incentives are the necessary step to bring renewable systems into mainstream use.

The opportunity to support home-based renewables is one that Vermont can not afford to pass-up; it will have

real impacts in not only the reduction of the state's dependence on outside energy producers and the global production of greenhouse gas emissions, but also

### **Top 3 reasons to support renewable energy in Vermont**

- 1) Security. Currently, the majority of our energy comes from out of state, and travels a long, vulnerable route to arrive at our homes. Renewable, distributed energy sources protect against anything from minor grid interruptions to terrorist attacks.
- 2) Economics. Buying energy from out of state sends jobs and revenue out as well. A thriving renewables industry will bolster Vermont's economy.
- 3) Global Climate Change. This increasing threat can only be mitigated by a reduction of our greenhouse gas emissions. By starting the shift towards renewables, Vermont will be a leader for the world.

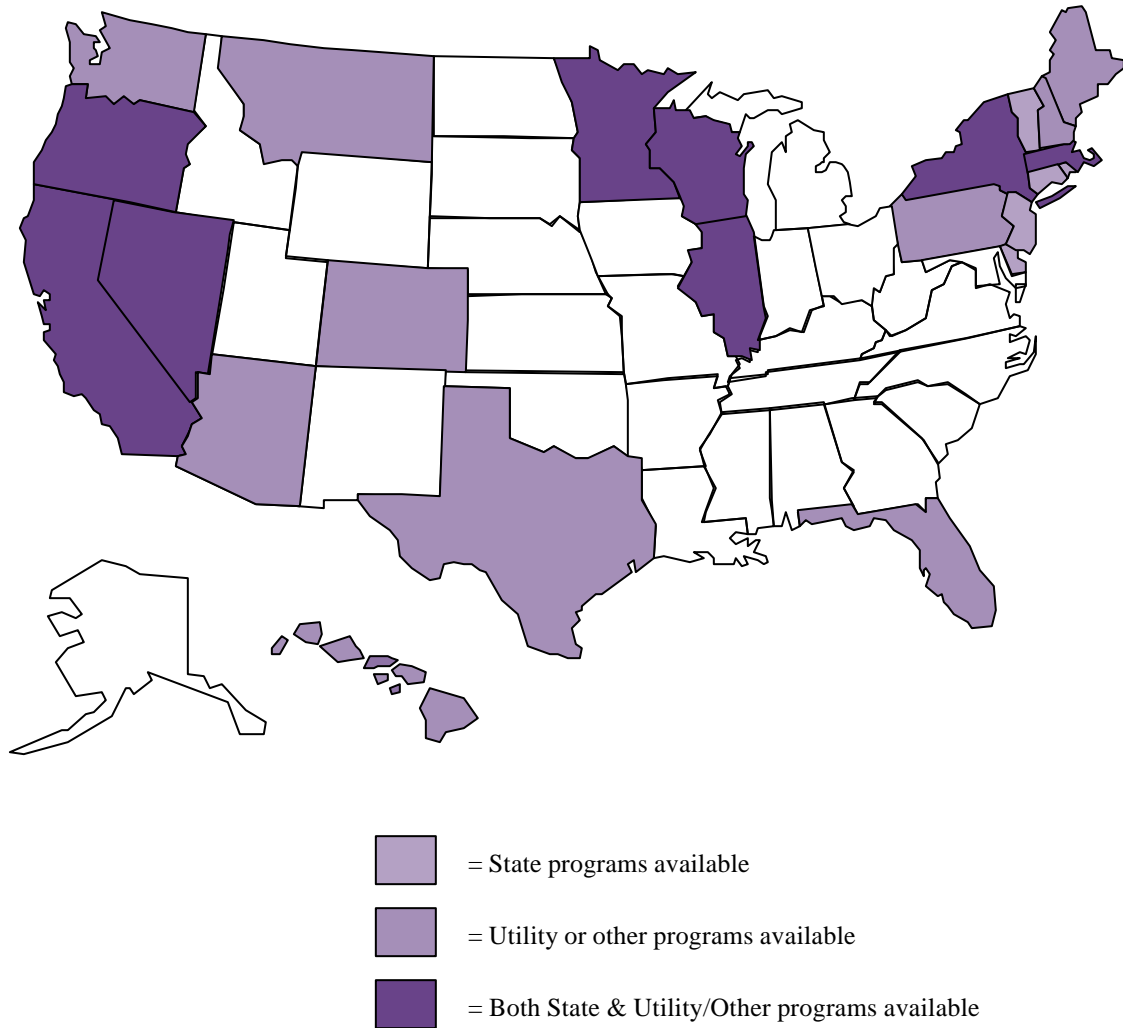
will stimulate the state economy, creating a variety of related jobs in production, retail, installation, and maintenance of renewable systems. Essentially, the benefits of a long-term, comprehensive incentive program are numerous, necessary, and profitable.

Vermont stands poised to become a leader in renewable energy, an example to the

country and to the world. A comprehensive renewable incentive program for homeowners is the first step towards a sustainable future.

## Appendices

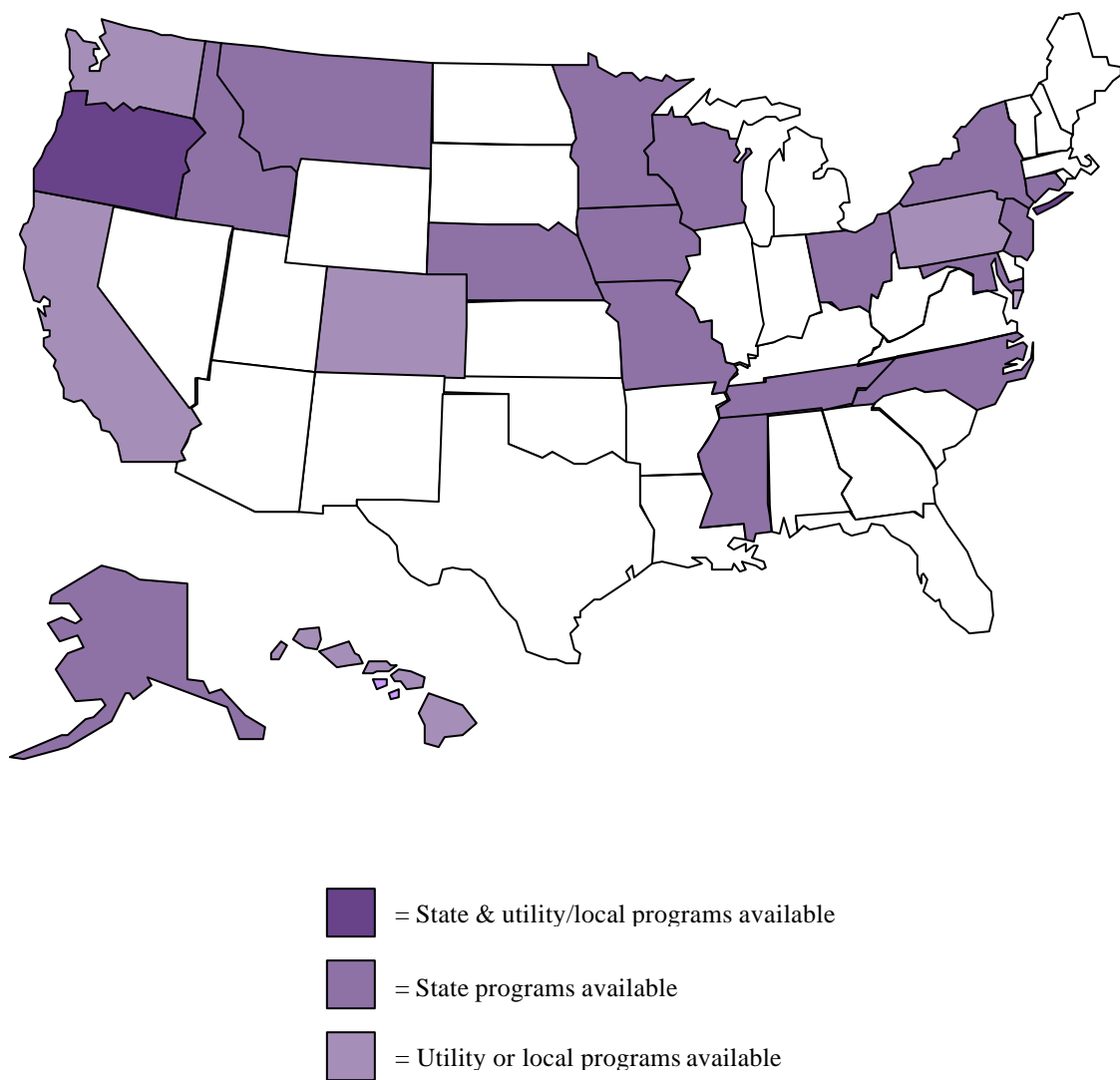
### *1. Map of Renewable Energy Rebate Programs in the U.S.<sup>61</sup>*



\* This map does not include rebates for renewable fuels or vehicles

<sup>61</sup> The Database for State Incentives for Renewable Energy ([http://www.dsireusa.org/library/docs/Rebate\\_Map.doc](http://www.dsireusa.org/library/docs/Rebate_Map.doc), accessed December 10, 2004).

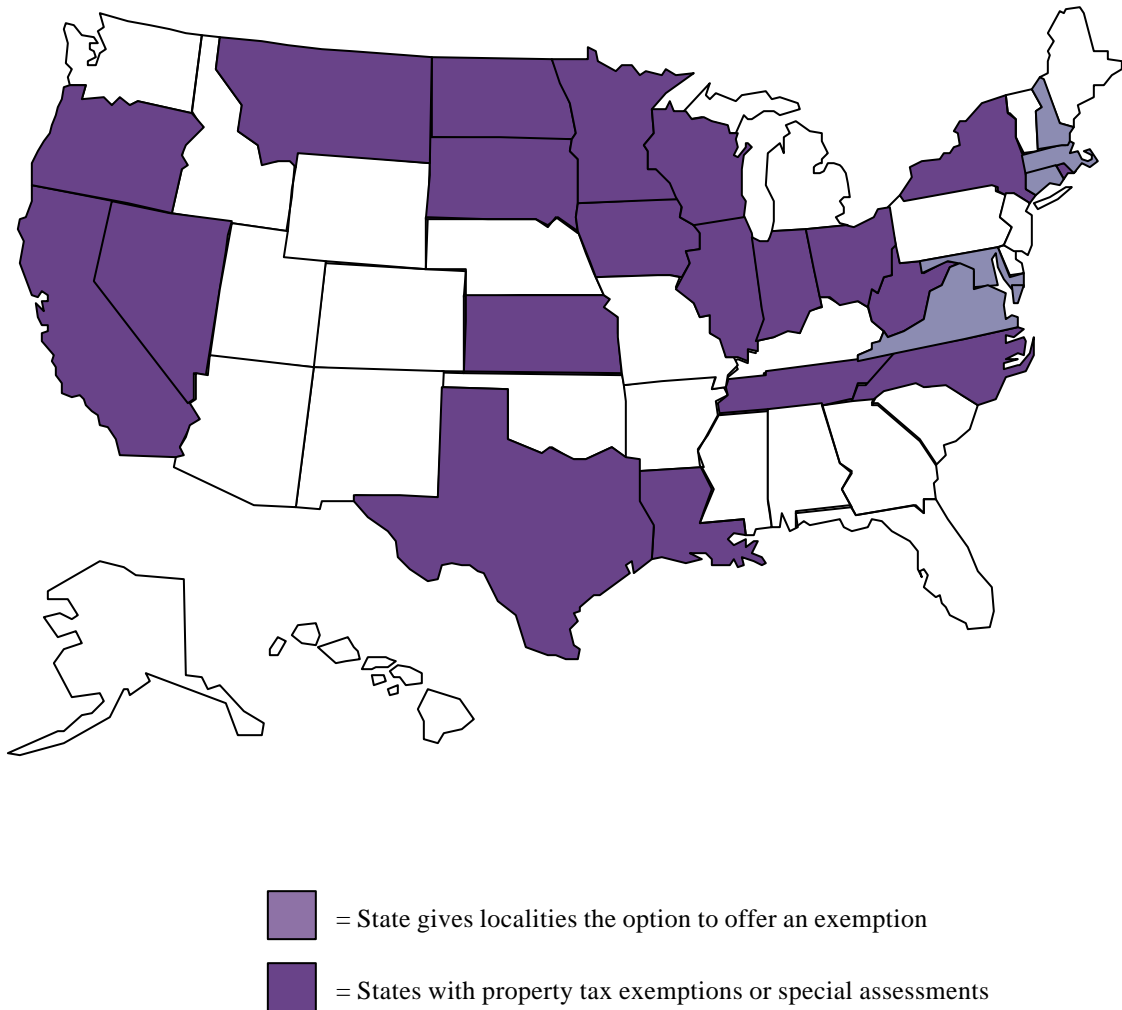
## 2. Map of Renewable Energy Loan Programs in the U.S.<sup>62</sup>



\* This map does not include loans for renewable fuels or vehicles

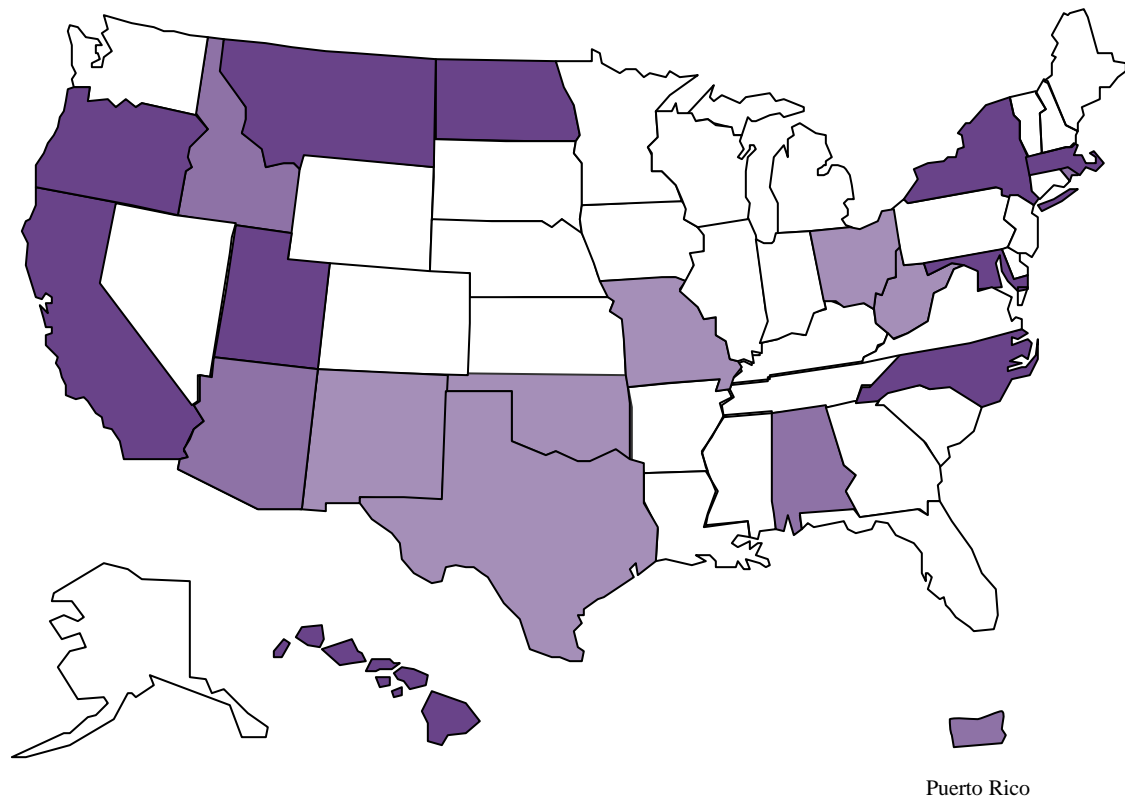
<sup>62</sup> The Database for State Incentives for Renewable Energy  
([http://www.dsireusa.org/library/docs/Loan\\_Map.doc](http://www.dsireusa.org/library/docs/Loan_Map.doc), accessed December 10, 2004).




### 3. Map of Renewable Energy Property Tax Exemptions in the U.S.<sup>63</sup>



<sup>63</sup> The Database for State Incentives for Renewable Energy  
([http://www.dsireusa.org/library/docs/PropertyTax\\_Map.doc](http://www.dsireusa.org/library/docs/PropertyTax_Map.doc), accessed December 10, 2004).

#### 4. Map of State Income Tax Incentives in the U.S.<sup>64</sup>



-  = State offers Personal & Corporate Income Tax Incentives
-  = State offers only Personal Income Tax Incentives
-  = State offers only Corporate Income Tax Incentives

\* This map does not include tax incentives for renewable fuels or vehicles

<sup>64</sup> The Database for State Incentives for Renewable Energy  
([http://www.dsireusa.org/library/docs/TaxIncentive\\_Map.doc](http://www.dsireusa.org/library/docs/TaxIncentive_Map.doc), accessed December 10, 2004).

## ***5. Timeline of Recent Vermont Legislative Activity***

Act 69, 2003-2004: Promotion of Energy Efficiency and Renewable Electric Generation.  
Senate 49, 2003-2004: The Energy Efficiency Charge.  
Senate 87, 2003-2004: Income Tax Credit for Renewable Energy Systems.  
House 687, 2003-2004: Energy Performance Contracting In Schools.  
Senate 169, 2001-2002: Renewable Energy Tax Credit.  
House 376, 2001-2002: Renewable Energy Tax Credit.  
House 458, 2001-2002: Tax Benefits for Renewable Energy and Energy Efficiency.  
Act R-300, 1999-2000: Renewable Energy Awareness Week.  
Act 60, 1999-2000: Energy Conservation Services By Public Service Board.  
Act 20, 1997-1998: Energy Standards and Residential Housing.

## ***6. Full Text URLs of Recent Vermont Legislative Activity***

Full Text of Act 69, 2003-2004:

<http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2004/acts/ACT069.HTM>

Full Text of Senate 49, 2003-2004: The Energy Efficiency Charge:

<http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2004/bills/intro/S-049.HTM>

Full Text of Senate 87, 2003-2004: Income Tax Credit for Renewable Energy Systems:

<http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2004/bills/intro/S-087.HTM>

Full Text of House 687, 2003-2004: Energy Performance Contracting In Schools:

<http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2004/bills/intro/H-687.HTM>

Full Text of Senate 169, 2001-2002: Renewable Energy Tax Credit:

<http://www.leg.state.vt.us/DOCS/2002/BILLS/INTRO/S-169.HTM>

Full Text of House 376, 2001-2002: Renewable Energy Tax Credit:

<http://www.leg.state.vt.us/DOCS/2002/BILLS/INTRO/H-376.HTM>

Full Text of House 458, 2001-2002: Tax Benefits for Renewable Energy and Energy Efficiency:

<http://www.leg.state.vt.us/DOCS/2002/BILLS/INTRO/H-458.HTM>

Full Text Act R-300, 1999-2000: Renewable Energy Awareness Week:

<http://www.leg.state.vt.us/DOCS/2000/ACTS/ACTR300.HTM>

Full Text of Act 60, 1999-2000: Energy Conservation Services By Public Service Board:

<http://www.leg.state.vt.us/DOCS/2000/ACTS/ACT060.HTM>

Full Text of Act 20, 1997-1998: Energy Standards and Residential Housing:

<http://www.leg.state.vt.us/DOCS/1998/ACTS/ACT020.HTM>



## **7. Summary of Act 69, 2003-2004<sup>65</sup>**

### **ACT NO. 69 (S.57)**

#### **Public Service; utility companies; energy efficiency; renewable electric generation**

This act adds a new statutory chapter addressing renewable energy programs. The chapter authorizes electric utilities upon approval of the Public Service Board to establish renewable pricing programs to allow electric consumers to voluntarily participate in programs that increase utilization of renewable energy sources by investing in renewable energy projects or by purchasing tradeable renewable energy credits. The Public Service Board is mandated to develop draft legislation proposing a renewable portfolio standard that might allow the Board to require a minimum percentage of renewable energy sources be included in the power supply portfolio for each seller of retail electricity in Vermont. Another section permits the Board to approve regulation of electric companies that differ from the traditional rate base, rate-of-return ratemaking regulation.

The act appropriates \$626,000.00, plus any unappropriated balance, from the petroleum violation escrow fund for use by the Department of Public Service in conjunction with the Department of Economic Development to establish a program of incentive payments to promote the installation of small scale renewable energy systems in Vermont residences and businesses.

The act amends the Department of Public Service statutory directive to formulate a 20-year electric plan for the state. A new plan shall be adopted no later than January 1, 2004 and submitted to the General Assembly.

In addition, the act provides for a study whether waste-to-energy which is part of an integrated waste management system should be designated as a renewable energy source.

Effective Date: From passage, June 17, 2003.

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<sup>65</sup> The Vermont General Assembly  
(<http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2004/acts/ACT069.SUM>, December 10, 2004).

## **8. Issue Summary**

### **Vermont Homeowner Renewable Energy Incentives**

#### **Justification**

Renewable energy provides: **1)** economic stimulus; **2)** increased energy security; and **3)** climate stabilization and reduced environmental impact. In addition, Vermont faces a challenging energy future, with contract expirations of Vermont Yankee and Hydro Quebec in the next 10-15 years. Incentives for Vermont homeowners to purchase and install renewable energy equipment will provide the necessary stimulus to develop the renewable energy market. Vermont prides itself as being independent and self-sufficient; however, in terms of energy production, it is heavily dependent on outside sources. Renewable energy incentives are an important mechanism for achieving energy independence.

#### **Federal and Vermont Legislation**

- National Energy Act of 1978 initiates federal renewable energy incentives. Tax credits of 40%, coupled with state matching credits, stimulate renewable energy market beyond installation and maintenance capacity. Program expires in 1986.
- Vermont Act 69 of 2003 enables the Vermont Small Wind and Solar Program to provide \$961,000 in rebates for solar PV, solar hot water, and wind systems. Funding runs out in only nine months.

#### **Model Renewable Energy Incentive Programs in New York and California**

- New York has a Public Benefit Charge on all electricity bills that funds a variety of renewable incentive programs, including loan programs, tax credits, and rebates.
- California has a variety of statewide initiatives. Many public utilities administer additional renewable incentive programs.

#### **Recommendations: Towards a Effective Strategy**

- Effective renewable incentive programs must **1)** have sustained funding, **2)** be comprehensive in nature, and **3)** be informed of key external factors.
- A program with sustained funding increases the confidence of both homeowners and businesses with regard to renewable energy investments, and thereby creates a market stimulus that encourages stable, continued growth.
- A comprehensive incentive strategy includes a combination of the following program types: loan programs, buy-downs (rebates or grants), and tax credits.
- External factors that must be considered include: ease of connecting to utility grid system; education about renewable energy and incentive options; and ease of access to renewable energy incentives.

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